DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
OFFICE ENGINEER
1727 30th Street MS-43
P.O. BOX 168041
SACRAMENTO, CA 95816-8041
FAX (916) 227-6214
www.dot.ca.gov/hq/esc/oe

Serious Drought.
Help save water!

February 17, 2016

08-SBd-18-49.0/51.7
08-0J9904
Project ID 0800000327
ACSTP-P018(051)E

Addendum No. 4

Dear Contractor:

This addendum is being issued to the contract for CONSTRUCTION ON STATE HIGHWAY IN SAN BERNARDINO COUNTY IN BIG BEAR LAKE FROM PINE KNOT AVENUE TO STANFIELD CUTOFF to revise the project plans, the *Notice to Bidders and Special Provisions*, and the *Bid* book.

Submit bids for this work with the understanding and full consideration of this addendum. The revisions declared in this addendum are an essential part of the contract.

Bids for this work will be opened on Wednesday, February 24, 2016.

Project plan sheets 1, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 44, 50, 51, 54, 55, 58, 59, 60, 106, 107, 108, 111, 119, 120, 121, 122, 124, 125, 127, 128, 130, 131, 133, 134, 136, 137, 139, 140, 145, 157, 158, 159, 163, 164, 165, 169, 170, 171, 173, 174, and 177 are replaced and attached for substitution for the like-numbered sheets.

Project plan sheets 174A, 176A and 176B are added and attached for addition to project plans.

In the *Notice to Bidders and Special Provisions*, in the "STANDARD PLANS LIST," the following Standard Plans are added:

"RSP ES-7G, RSP ES-7R, RSP ES-8A."

In the Special Provisions, Section 5 Control of Work is replaced as attached.

In the Special Provisions, Section 86-2.06 is replaced as attached.

In the Special Provisions, Section 86-2.09E is replaced as attached.

In the Special Provisions, Section 86-2.11A is replaced as attached.

In the Special Provisions, Section 86-5.01A(1) is replaced as attached.

In the Special Provisions, Section 86-6.02 is added as attached.

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In the *Bid* book, in the "Bid Item List," Items 22, 25, 32, 36, 42 and 59 are replaced.

In the *Bid* book, in the "Bid Item List," Items 61, 62, 63 and 64 are added.

In the *Bid* book, in the "Bid Item List," Items 23, 29 and 60 are deleted.

To *Bid* book holders:

Inquiries or questions in regard to this addendum must be communicated as a bidder inquiry and must be made as noted in the *Notice to Bidders* section of the *Notice to Bidders and Special Provisions*.

Submit the *Bid* book as described in the *Electronic Bidding Guide* at the Bidders' Exchange website.

http://www.dot.ca.gov/hq/esc/oe/electronic_bidding/electronic_bidding.html

Inform subcontractors and suppliers as necessary.

This addendum, EBS addendum file and attachments are available for the Contractors' download on the Web site:

http://www.dot.ca.gov/hq/esc/oe/project_ads_addenda/08/08-0J9904

If you are not a *Bid* book holder, but request a book to bid on this project, you must comply with the requirements of this letter before submitting your bid.

Sincerely,

JOHN BULINSKI
District Director

Attachments

5 CONTROL OF WORK

Add to section 5-1.20A:

During the progress of the work under this Contract, work under the following contracts may be in progress at or near the job site of this Contract:

Coincident or Adjacent Contracts

Contract no.	County–Route–Post Mile	Location	Type of work
08-13-N-MC-0352	R48.518-49.11	City of Big Bear Lake	Street Improvement
Permit TBD	R48.51-51.70	Bear Valley Electric Services	Relocate utilities underground
Permit TBD	R48.51-51.70	Verizon	Relocate utilities underground
Permit TBD	R48.51-51.70	Charter Communications	Relocate utilities underground

Add to section 5-1.36D:

The utility owner will relocate a utility shown in the following table before the corresponding date shown:

Utility Relocation and Date of the Relocation

Utility	Location	Date
ELECTRIC (BVES)		
POWER POLE (CONFLICT 2E, U-1)	48.52 LT STATION 10+34.31 CL BB1	10/30/2015
VAULT (CONFLICT 5E, U-1)	42.34 LT STATION 11+48.26 CL BB1	10/30/2015
POWER POLE (CONFLICT 11E, U-2)	36.76 LT STATION 16+17.45 CL BB1	10/30/2015
VAULT (CONFLICT 13E, U-2)	36.25 LT STATION 16+73.11 CL BB1	10/30/2015
POWER POLE (CONFLICT 14E, U-2)	37.69 LT STATION 17+34.43 CL BB1	10/30/2015
POWER POLE (CONFLICT 17E, U-3)	36.66 LT STATION 21+3.25 CL BB1	10/30/2015
POWER POLE (CONFLICT 18E, U-3)	36.42 LT STATION 22+3.33 CL BB1	10/30/2015
VAULT (CONFLICT 20E, U-3)	37.12 LT STATION 22+60 CL BB1	10/30/2015
POWER POLE (CONFLICT 21E, U-3)	36.52 LT STATION 23+49.47 CL BB1	10/30/2015
MH (CONFLICT 22 E, U-4)	35.53 LT STATION 26+30.46 CL BB1	10/30/2015
POWER POLE (CONFLICT 23E, U-4)	36.71 LT STATION 26+48.46 CL BB1	10/30/2015
POWER POLE (CONFLICT 27E, U-5)	37.38 LT STATION 28+68.31 CL BB1	10/30/2015
POWER POLE (CONFLICT 29E, U-5)	36.7 LT STATION 29+87.36 CL BB1	10/30/2015
POWER POLE (CONFLICT 31E, U-5)	36.75 LT STATION 31+79.87 CL BB1	10/30/2015
VAULT (CONFLICT 32E, U-5)	35.43 LT STATION 32+1.20 CL BB1	10/30/2015
POWER POLE (CONFLICT 35E, U-6)	36.82 LT STATION 33+36.26 CL BB1	10/30/2015
POWER POLE (CONFLICT 36E, U-6)	36.93 LT STATION 34+74.74 CL BB1	10/30/2015
POWER POLE (CONFLICT 38E, U-6)	35.23 RT STATION 35+82.09 CL BB1	10/30/2015
POWER POLE (CONFLICT 41E, U-7)	36.45 LT STATION 38+23.89 CL BB1	10/30/2015
VAULT (CONFLICT 42E, U-7)	37.39 LT STATION 38+46.00 CL BB1	10/30/2015
POWER POLE (CONFLICT 44E, U-7)	38.7 LT STATION 40+10.60 CL BB1	10/30/2015
VAULT (CONFLICT 45E, U-7)	36.54 LT STATION 40+70.41 CL BB1	10/30/2015
POWER POLE (CONFLICT 46E, U-7)	36.61 LT STATION 41+46.83 CL BB1	10/30/2015
VAULT (CONFLICT 50E, U-9)	36.85 LT STATION 45+80.15 CL BB1	10/30/2015
POWER POLE (CONFLICT 51E, U-9)	39.42 LT STATION 46+15.10 CL BB1	10/30/2015
POWER POLE (CONFLICT 53E, U- 9)	36.77 LT STATION 49+47.12 CL BB1	07/15/2016
POWER POLE (CONFLICT 53 AE, U-9)	54.79 LT STATION 49+62.69 CL BB1	07/15/2016
VAULT (CONFLICT 54E, U-10)	36.52 LT STATION 51+84.77 CL BB1	07/15/2016
POWER POLE (CONFLICT 56E, U-11)	40.65 LT STATION 56+28.20 CL BB1	07/15/2016

VAULT (CONFLICT 59 AE, U-12)	39 LT STATION 59+68.19 CL BB1	07/15/2016
POWER POLE (CONFLICT 60E, U-12)	35.41 LT STATION 62+36.55 CL BB1	07/15/2016
VAULT (CONFLICT 62 E, U-12)	37.84 LT STATION 63+95.79 CL BB1	07/15/2016
VAULT (CONFLICT 62 EA, U-13)	39.45 LT STATION 69+31.01 CL BB1	07/15/2016
VAULT (CONFLICT 66 E, U-15)	38.89 LT STATION 76+80.38 CL BB1	07/15/2016
VAULT (CONFLICT 79 E, U-17)	37.23 LT STATION 85+80.00 CL BB1	07/15/2016
VAULT (CONFLICT 87 E, U-19)	42.43 LT STATION 93+71.00 CL BB1	07/15/2016
CHARTER COMMUNICATION		
CHARTER RELOCATION	FROM STATION 95+00 T0 142+50	05/15/2016
CHARTER RELOCATION	FROM STATION 31+50 T0 50+00	06/15/2016
CHARTER RELOCATION	FROM STATION 10+00 T0 31+50	07/31/2016
CHARTER RELOCATION	FROM STATION 50+00 T0 95+00	08/31/2016

Installation of the utilities shown in the following table requires coordination with your activities. Make the necessary arrangements with the utility company through the Engineer and submit a schedule:

1. Verified by a representative of the utility company
2. Allowing at least the time shown for the utility owner to complete its work

Utility Relocation and Contractor-Arranged Time for the Relocation

Utility	Utility address	Location	Days
City of Big Bear Lake (CBBL)			
TLMH (CBBL 5)		37.36 LT STATION 28+57.86	**3-Day Notice**
TLMH (CBBL 6)		36.39 LT STATION 32+83.75	**3-Day Notice**
TLMH (CBBL 7)		36.5 LT STATION 37+75.04	**3-Day Notice**
TLMH (CBBL 8)		37.53 LT STATION 45+30.12	**3-Day Notice**
TLMH (CBBL 9)		33.93 LT STATION 56+53.72	**3-Day Notice**
TLMH (CBBL 10)		36.62 LT STATION 62+55.55	**3-Day Notice**
SEWER MH (CBBL 11)		37.32 RT STATION 71+46.79	**3-Day Notice**
TLMH (CBBL 12)		39.70 LT STATION 73+89.18	**3-Day Notice**
SEWER MH (CBBL 13)		38.57 RT STATION 74+92.02	**3-Day Notice**
SEWER MH (CBBL 14)		37.46 RT STATION 77+80.79	**3-Day Notice**
SEWER MH (CBBL 15)		37.73 RT STATION 78+33.93	**3-Day Notice**
SEWER MH (CBBL 16)		37.45 RT STATION 81+0.68	**3-Day Notice**
TLMH (CBBL 17)		38.53 LT STATION 80+48.57	**3-Day Notice**
SEWER MH (CBBL 18)		34.12 RT STATION 83+32.95	**3-Day Notice**
TLMH (CBBL 19)		37.34 LT STATION 92+73.84	**3-Day Notice**
SEWER MH (CBBL 20)		21.42 RT STATION 100+29.21	**3-Day Notice**
SEWER MH (CBBL 20A)		34.61 RT STATION 103+3.63	**3-Day Notice**
SEWER MH (CBBL 21)		34.01 RT STATION 105+73.78	**3-Day Notice**
TLMH MH (CBBL 21A)		37.35 LT STATION 108+40.06	**3-Day Notice**
SEWER MH (CBBL 22)		41.61 RT STATION 110+71.22	**3-Day Notice**
TLMH MH (CBBL 23A)		36.84 LT STATION 114+15.37	**3-Day Notice**

TLMH (CBBL 24)		36.43 LT STATION 120+5.15	**3-Day Notice**
TLMH MH (CBBL 25)		32.44 RT STATION 126+15.95	**3-Day Notice**
SEWER MH (CBBL 26)		34.27 RT STATION 136+61.95	**3-Day Notice**
SEWER MH (CBBL 28)		37.00 RT STATION 138+59.95	**3-Day Notice**
Electric (Bear Valley Electric)			
POWER POLE (CONFLICT 93 AE, U-19)		34.04 RT STATION 95+60.00 CL BB1	30-Day Notice
VAULT (CONFLICT 95 E, U-20)		39.31 RT STATION 101+80.86 CL BB1	30-Day Notice
VAULT (CONFLICT 97 E, U-20)		37.06 LT STATION 103+32.55 CL BB1	30-Day Notice
POWER POLE (CONFLICT 98 E, U-20)		67.38 RT STATION 99+8.77 CL BB1	30-Day Notice
VAULT (CONFLICT 103 E, U-22)		38.92 LT STATION 108+80.86 CL BB1	30-Day Notice
POWER POLE (CONFLICT 108 E, U-22)		50.02 RT STATION 110+28.79 CL BB1	30-Day Notice
VAULT (CONFLICT 110 E, U-22)		50.02 RT STATION 110+28.79 CL BB1	30-Day Notice
VAULT (CONFLICT 110 A E, U-22)		41.80 LT STATION 111+65.00 CL BB1	30-Day Notice
Water			
FIRE HYDRANT (CONFLIC 1W, U-1)		44.13 LT STATION 9+54.269 CL BB1	3-Day Notice
FIRE HYDRANT (CONFLICT 5W, U-3)		36.91 LT STATION 18+60.72 CL BB1	3-Day Notice
FIRE HYDRANT (13 W, U-16)		60.83 LT STATION 79+44.15 CL BB1	3-Day Notice

Utility Contact Information and Special Notices:

Bear Valley Electric
Contact: Bridgette Burton, Project Manager (909) 866-4678

City of Big Bear Lake
Contact: David Lawrence, Director of Public Works (909) 866-5831

Big Bear Lake Department of Water and Power
Contact: Steve Wilson, Water Superintendent
Desk: (909) 866-5050, x211
Mobile: (909) 709-6616

Contact: Danny Ent, Transmission/Distribution Supervisor
Desk: (909) 866-5050, x224

Charter Communications
Contact: Neal Neiman, Business Construction Coordinator (760) 596-4374

Verizon
Contact: Steve Parrett, Lead Engineer Network Engineering and Planning (760) 245-0660

Southwest Gas Corporation
Contact: Andy Hallman
Desk: (909) 878-0189
Cell: (760)-403-5321
Emergency: 1-877-860-6020

Southwest Gas Corporation Construction Notice:
CAUTION: DISTRIBUTION AND HIGH PRESSURE GAS MAINS ARE LOCATED WITHIN THE EXTENTS OF THE PROJECT. CONTRACTOR SHALL FOLLOW ALL ONE-CALL LAWS BY CALLING 811 FOR LINE LOCATES A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION. IF SOUTHWEST GAS FACILITIES ARE WITHIN 24 INCHES OF THE EXCAVATION ACTIVITIES, PLEASE NOTIFY AND SCHEDULE SOUTHWEST GAS FOR STANDBY PRIOR TO THE EXCAVATION WITH EQUIPMENT BY CALLING 760-951-4003.

Notice for Contractor to Adjust Manholes:

The City of Big Bear Lake shall furnish all sewer manhole frames and covers for installation at no additional cost or expense to Contractor. The manhole will be of watertight and locking variety per City Standard Drawing S-3 and S-3a. All other types of manhole frames and covers shall be salvaged and reset to proper grade by contractor. The bid price and payment shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved, complete in place, as shown on the plans, as specified in the standard specifications and these special provisions, and as directed by the engineer.

Add to section 86-2.06A(1) of the RSS for section 86-2.06, after the 1st paragraph:

Cover marking must be as follows:

1. *SIGNAL AND LIGHTING* for signal and lighting system

Replace "Reserved" in section 86-2.06B of the RSS for section 86-2.06 with:

86-2.06B(1) General

86-2.06B(1)(a) Summary

Section 86-2.06B includes specifications for installing non-traffic-rated pull boxes.

86-2.06B(1)(b) Submittals

Before shipping pull boxes to the job site, submit a list of materials used to fabricate the pull boxes to METS. Include:

1. Contract number
2. Manufacturer's name
3. Manufacturer's installation instructions
4. Your contact information

Submit reports for pull boxes from an NRTL-accredited laboratory.

Before installing a pull box and cover, submit the manufacturer's replacement warranty for them.

86-2.06B(1)(c) Quality Control and Assurance

86-2.06B(1)(c)(i) Functional Testing

The pull box and cover must be tested under ANSI/SCTE 77, "Specification for Underground Enclosure Integrity."

86-2.06B(1)(c)(ii) Warranty

Provide a 2-year manufacturer's replacement warranty for the pull box and cover. The warranty period starts on the date of Contract acceptance.

Deliver replacement parts within 5 business days after you receive notification of a failed pull box, cover, or both to the Department's Maintenance Electrical Shop at:

District 8 Warehouse,
North Region Maintenance MS 9
175 W. Cluster St, San Bernardino, CA 92408

86-2.06B(2) Materials

The pull box and cover must comply with ANSI/SCTE 77, "Specification for Underground Enclosure Integrity," for tier 22 load rating and must be gray or brown.

Each pull box cover must have an electronic marker cast inside.

A pull box extension must be made of the same material as the pull box and attached to the box to maintain the minimum combined depths.

Include recesses for a hanger if a transformer or other device must be placed in a pull box.

The bolts, nuts, and washers must be a captive design.

The captive bolt must be capable of withstanding a torque from 55 to 60 ft-lb and a minimum pull-out strength of 750 lb. Perform the test with the cover in place and the bolts torqued. The pull box and cover must not be damaged while performing the test.

Hardware must be stainless steel with 18 percent chromium and 8 percent nickel content.

Galvanize ferrous metal parts under section 75-1.05.

The manufacturer's instructions must include:

1. Quantity and size of entries that can be made without degrading the strength of the pull box below the tier 22 load rating
2. Locations where side entries cannot be made
3. Acceptable method for creating the entry

The tier 22 load rating must be labeled or stenciled by the manufacturer on the inside and outside of the pull box and on the underside of the cover.

86-2.06B(3) Construction

Do not install a pull box in curb ramps or driveways.

A pull box for a post or a pole standard must be located within 5 feet of the standard. Place the pull box adjacent to the back of the curb or edge of the shoulder. If this is impractical, place the pull box in a suitable, protected, and accessible location.

Replace the 1st paragraph of section 86-2.09E with:

Splices must be insulated by "Method B."

Delete the 6th and 7th paragraphs of section 86-2.09E.

Replace 8th& 9th paragraphs of section 86-2.09E with:

Splices must be insulated by "Method B."

Use Method B as follows:

1. Cover the splice area completely with an electrical insulating coating and allow it to dry.
2. Apply 3 layers of half-lapped 80 mils PVC tape.
3. Apply 2 layers of 120 mils Butyl rubber stretchable tape with liner.
4. Apply 3 layers of half-lapped 6 mils PVC pressure-sensitive adhesive tape.
5. Cover the entire splice with an electrical insulating coating and allow it to dry.

Add to section 86-2.11A:

Continuous welding of exterior seams in service equipment enclosures is not required.

Circuit breakers must be the plug in cable type mounted on non-energized clips. All circuit breakers must be mounted vertically with the up position of the handle being the "ON" position.

Each service must be provided with up to 2 main circuit breakers that will disconnect ungrounded service entrance conductors. Where the "Main" circuit breaker consists of 2 circuit breakers as described, each of the circuit breakers must have a minimum interrupting capacity of 10,000 A, rms.

Add to section 86-2.11A, after 5th paragraph:

The main and neutral busses of the enclosure must be made of tin-plated copper and rated for 125 A and be suitable for copper or aluminum conductors.

Identify each circuit breaker and component by description using an engraved phenolic nameplate.

The nameplate must be installed using stainless steel rivets or screws:

1. Adjacent to the breaker on the dead front panel. The characters must be a minimum of 1/8 inch high.
2. Adjacent to the component on the back panel. The characters must be a minimum of 1/8 inch high.
3. At the top exterior of the door panel. The nameplate must include the system number, voltage, and number of phases engraved in a minimum 3/16-inch-high characters.

A plastic-laminated wiring diagram must be attached inside the enclosure with brass eyelets by a UL listed or NRTL certified method.

Locate the foundation such that the minimum clearance around the front and back of the enclosure complies with NEC, Article 110.26, "Spaces About Electrical Equipment" (600 V, nominal or less).

The meter area must be have a sealable, lockable, weathertight cover that can be removed without the use of tools.

Service equipment enclosure must be factory wired.

The dead front panel on a Type III service equipment enclosure must have a continuous stainless steel or aluminum piano hinge. This panel or dead front panel must be secured with a latch or captive screws. No live part must be mounted on this panel or dead front panel.

The enclosures must be rated NEMA 3R and include a dead front panel and a hasp with a 7/16-inch-diameter hole for a padlock.

If a Type III enclosure houses a transformer of more than 1 kVA, the enclosure must have an effective screened ventilation louvers of no less than 50 sq. in for each louver. The framed screen must be stainless no. 304 with a no. 10 size mesh and secured with at least 4 bolts.

The fasteners on the exterior of an enclosure must be vandal-resistant and not removable. The exterior screws, nuts, bolts, and washers must be stainless steel.

Landing lugs must be sized for the incoming service utility conductors, be compatible with either copper or aluminum conductors and be copper or tin-plated aluminum. Live parts of the electrical equipment must be guarded against accidental contact.

The interior of the enclosure must accept plug-in circuit breakers. A minimum of 6 standard single pole circuit breakers, 3/4" nominal, must be provided for branch circuits. Circuit breakers for a service equipment enclosure must have interior made of copper.

For Type III-A, -B, and -C enclosures, the meter socket must be a 5-clip type and the landing lug must be suitable for multiple conductors.

For Type III-D enclosure, the meter socket must be a 7-clip type and the landing lug must be suitable for multiple conductors. The pedestal must comply with the Electric Utility Service Equipment Requirements Committee (EUSERC) drawing no. 308 or 309.

Install a grounding electrode for each cabinet, service equipment enclosure, and transformer. Attach a grounding conductor from the electrode to the equipment using either a ground clamp or exothermic weld. Connect the other end to the cabinet, service equipment enclosure and transformer.

Add to section 86-5.01A(1):

Loop wire must be Type 2.

Loop detector lead-in cable must be Type B.

Slots must be filled with hot-melt rubberized asphalt sealant.

You may use a Type E loop where shown.

For Type E detector loops, sides of the slot must be vertical and the minimum radius of the slot entering and leaving the circular part of the loop must be 1-1/2 inches. Slot width must be a maximum of 5/8 inch. Loop wire for circular loops must be Type 2. Slots of circular loops must be filled with hot-melt rubberized asphalt sealant.

Install Type 1 or 2 inductive loop conductor except for Type E loops detectors use Type 2.

Install conductor continuous without splices except at the pull box.

Center the detectors in the traffic lanes.

Do not splice the detector conductor.

Mark the location of the inductive loop detectors so the distance between the side of the loop and a lead-in sawcut from an adjacent detector is at least 2 feet. The distance between lead-in sawcuts must be at least 6 inches.

Sawcut the slots. The slot bottoms must be smooth with no sharp edges. For Type E detector loops, saw the slots so the sides are vertical.

Do not allow residue from slot-cutting activities to flow across shoulders or lanes occupied by traffic. Remove the residue before it flows off the pavement surface and dispose of it.

Wash the slots clean using water and blow dry with compressed air to remove all moisture and debris.

Identify the start of the conductor.

Waterproof the ends of Type 2 loop conductor before installing it in the conduit to prevent moisture from entering the cable.

Install the loop conductor in the slots and lead-in sawcut using a 3/16- to 1/4-inch-thick wood paddle. Hold the conductors in place at the bottom of the slot with wood paddles during placement of the sealant.

Wind adjacent loops on the same sensor unit channel in opposite directions.

Twist the conductors for each loop into a pair consisting of a minimum of 2 turns per foot before placing them in the lead-in sawcut and the conduit leading to the pull box. Do not install more than 2 twisted pairs of conductors per lead-in sawcut.

Provide 5 feet of slack in the pull box.

Test each loop for continuity, circuit resistance, and insulation resistance before filling the slots with sealant.

Remove excess sealant from the adjacent road surface before it sets. Do not use solvents to remove the excess.

Identify the loop conductor pair in the pull box with the start with the letter *S* and the end with the letter *F*. Band conductors in pairs by lane in the pull box adjacent to the loops and in the cabinet. Identify each pair with detector designation and loop number.

All splices must be soldered using the hot iron, pouring, or dipping method. Do not perform open-flame soldering.

For Detector lead-in cable:

1. Waterproof the ends of the lead-in cable before installing it in the conduit to prevent moisture from entering the cable.
2. Splice loop conductors for each direction of travel for the same phase, terminating in the same pull box, to a separate lead-in cable which must run from the pull box adjacent to the loop detector to a sensor unit mounted in the controller cabinet. Install lead-in cable continuous without splices except at the pull box.
3. Verify in the presence of the Engineer that the loops are operational before making the final splices between loop conductors and the lead-in cable.
4. Identify and tag each lead-in cable with detector designation at the cabinet and pull box adjacent to the loops.

Replace section 86-6.02 with:

86-6.02 LED LUMINAIRES

86-6.02A General

86-6.02A(1) Summary

Section 86-6.02 includes specifications for installing LED luminaires.

86-6.02A(2) Definitions

CALiPER: Commercially Available LED Product Evaluation and Reporting. A U.S. DOE program that individually tests and provides unbiased information on the performance of commercially-available LED luminaires and lights.

correlated color temperature: Absolute temperature in kelvin of a blackbody whose chromaticity most nearly resembles that of the light source.

house side lumens: Lumens from a luminaire directed to light up areas between the fixture and the pole, such as sidewalks at intersection or areas off the shoulders on freeways.

International Electrotechnical Commission (IEC): Organization that prepares and publishes international standards for all electrical, electronic, and related technologies.

junction temperature: Temperature of the electronic junction of the LED device. The junction temperature is critical in determining photometric performance, estimating operational life, and preventing catastrophic failure of the LED.

L70: Extrapolated life in hours of the luminaire when the luminous output depreciates 30 percent from initial values.

LM-79: Test method from the Illumination Engineering Society of North America specifying test conditions, measurements, and report format for testing solid state lighting devices, including LED luminaires.

LM-80: Test method from the Illumination Engineering Society of North America specifying test conditions, measurements, and report format for testing and estimating the long-term performance of LEDs for general lighting purposes.

National Voluntary Laboratory Accreditation Program (NVLAP): U.S. DOE program that accredits independent testing laboratories.

power factor: Ratio of the real power component to the complex power component.

street side lumens: Lumens from a luminaire directed to light up areas between the fixture and the roadway, such as traveled ways and freeway lanes.

surge protection device (SPD): Subsystem or component that protects the unit against short-duration voltage and current surges.

total harmonic distortion: Ratio of the rms value of the sum of the squared individual harmonic amplitudes to the rms value of the fundamental frequency of a complex waveform.

86-6.02A(3) Submittals

Submit a sample luminaire to METS for testing after the manufacturer's testing is completed. Include the manufacturer's test data.

Product submittals must include:

1. LED luminaire checklist.
2. Product specification sheets, including:
   2.1. Maximum power in watts.
   2.2. Maximum designed junction temperature.
   2.3. Heat sink area in square inches.
   2.4. Designed junction to ambient thermal resistance calculation with thermal resistance components clearly defined.
   2.5. L70 in hours when extrapolated for the average nighttime operating temperature.
3. LM-79 and LM-80 compliant test reports from a CALiPER-qualified or NVLAP-approved testing laboratory for the specific model submitted.
4. Photometric file based on LM-79 test report.
5. Initial and depreciated isofootcandle diagrams showing the specified minimum illuminance for the particular application. The diagrams must be calibrated to feet and show a 40 by 40 foot grid. The diagrams must be calibrated to the mounting height specified for that particular application. The depreciated isofootcandle diagrams must be calculated at the minimum operational life.
6. Test report showing SPD performance as tested under ANSI/IEEE C62.41.2 and ANSI/IEEE C62.45.
7. Test report showing mechanical vibration test results as tested under California Test 611 or equal.
8. Data sheets from the LED manufacturer that include information on life expectancy based on junction temperature.
9. Data sheets from the power supply manufacturer that include life expectancy information.

Submit documentation of a production QA performed by the luminaire manufacturer that:

1. Ensures the minimum specified performance level
2. Includes a documented process for resolving problems

Submit the QA documentation as an informational submittal.

Submit the manufacturer's warranty documentation as an informational submittal before installing LED luminaires.

86-6.02A(4) Quality Control and Assurance

86-6.02A(4)(a) General

The Department may test random samples of the luminaires under section 86-2.14A. The Department tests luminaires under California Test 678 and may test any parameters specified in section 86-6.01.

Fit 1 sample luminaire with a thermistor or thermocouple temperature sensor. A temperature sensor must be mounted on the:

1. LED solder pad as close to the LED as possible
2. Power supply case
3. Light bar or modular system as close to the center of the module as possible

Other configurations must have at least 5 sensors per luminaire. The Engineer provides advice on sensor location. Thermocouples must be either Type K or C. Thermistors must be a negative-temperature-coefficient type with a nominal resistance of 20 kΩ. Use the appropriate thermocouple wire. The leads must be a minimum of 6 feet. Submit documentation with the test unit describing the type of sensor used.

Before performing any testing, energize the sample luminaires for a minimum of 24 hours at 100 percent on-time duty cycle and a temperature of +70 degrees F.

Depreciate the luminaire lighting's performance for the minimum operating life by using the LED manufacturer's data or the data from the LM-80 test report, whichever results in a higher lumen depreciation.

Failure of the luminaire that renders the unit noncompliant with section 86-6.02 specifications is cause for rejection.

86-6.02A(4)(b) Warranty

Provide a 7-year manufacturer's warranty against any defects or failures. The warranty period begins on the date of Contract acceptance. Furnish a replacement luminaire within 10 days after receipt of the failed luminaire. The Department does not pay for the replacement. Deliver replacement luminaires to the Department's Maintenance Electrical Shop at:

District 8 Warehouse,
Attention Steve Parks
13692 Mariposa Rd, Victorville, CA 92395

86-6.02B Materials

86-6.02B(1) General

The luminaire must include an assembly that uses LEDs as the light source. The assembly must include a housing, an LED array, and an electronic driver. The luminaire must:

1. Be UL listed under UL 1598 for luminaires in wet locations or an equivalent standard from a recognized testing laboratory
2. Have a minimum operational life of 63,000 hours
3. Operate at an average operating time of 11.5 hours per night
4. Be designed to operate at an average nighttime operating temperature of 70 degrees F
5. Have an operating temperature range from -40 to +130 degrees F
6. Be defined by the following applications:

Application	Replaces
Roadway 1	200 W high-pressure sodium luminaire mounted at 34 ft
Roadway 2	310 W high-pressure sodium luminaire mounted at 40 ft
Roadway 3	310 W high-pressure sodium luminaire mounted at 40 ft with back side control
Roadway 4	400 W high-pressure sodium luminaire mounted at 40 ft

The individual LEDs must be connected such that a catastrophic loss or a failure of 1 LED does not result in the loss of more than 20 percent of the luminous output of the luminaire.

86-6.02B(2) Luminaire Identification

Each luminaire must have the following identification permanently marked inside the unit and outside of its packaging box:

1. Manufacturer's name
2. Trademark
3. Model number
4. Serial number
5. Month and year of manufacture
6. Lot number
7. Contract number
8. Rated voltage
9. Rated wattage
10. Rated power in VA

86-6.02B(3) Electrical Requirements

The luminaire must operate from a 60 ± 3 Hz AC power source. The fluctuations of line voltage must have no visible effect on the luminous output. The operating voltage may range from 120 to 480 V(ac). The luminaire must operate over the entire voltage range or the voltage range must be selected from either of the following options:

1. Luminaire must operate over a voltage range of 95 to 277 V(ac). The operating voltages for this option are 120 V(ac) and 240 V(ac).
2. Luminaire must operate over a voltage range of 347 to 480 V(ac). The operating voltage for this option is 480 V(ac).

The power factor of the luminaire must be 0.90 or greater. The total harmonic distortion, current, and voltage induced into an AC power line by a luminaire must not exceed 20 percent. The maximum power consumption allowed for the luminaire must be as shown in the following table:

Application	Maximum consumption (watts)
Roadway 1	165
Roadway 2	235
Roadway 3	235
Roadway 4	300

86-6.02B(4) Surge Suppression and Electromagnetic Interference

The luminaire's on-board circuitry must include an SPD to withstand high repetition noise transients caused by utility line switching, nearby lightning strikes, and other interferences. The SPD must protect the luminaire from damage and failure due to transient voltages and currents as defined in Tables 1 and 4 of ANSI/IEEE C64.41.2 for location category C-High. The SPD must comply with UL 1449. The SPD must be tested under ANSI/IEEE C62.45 based on ANSI/IEEE C62.41.2 definitions for standard and optional waveforms for location category C-High.

The luminaires and associated on-board circuitry must comply with the Class A emission limits under 47 CFR 15, subpart B, for the emission of electronic noise.

86-6.02B(5) Compatibility

The luminaire must be operationally compatible with currently-used lighting control systems and photoelectric controls.

86-6.02B(6) Photometric Requirements

The luminaire must maintain a minimum illuminance level throughout the minimum operating life. The L70 of the luminaire must be the minimum operating life or greater. The measurements must be calibrated to standard photopic calibrations. The minimum maintained illuminance values measured at a point must be as shown in the following table:

Application	Mounting height (ft)	Minimum maintained illuminance (fc)	Light pattern figure (isofootcandle curve)
Roadway 1	34	0.15	Pattern defined by an ellipse with the equation: where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 20 feet to the house side of the pattern.
Roadway 2	40	0.2	Pattern defined by an ellipse with the equation: where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 20 feet to the house side of the pattern.
Roadway 3	40	0.2	Pattern defined by an ellipse with the equation: for $y \geq 0$ (street side) where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 20 feet to the house side of the pattern.
Roadway 4	40	0.2	Pattern defined by an ellipse with the equation: where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 23 feet to the house side of the pattern.

The luminaire must have a correlated color temperature range from 3,500 to 6,500 K. The color rendering index must be 65 or greater.

The luminaire must not allow more than:

1. 10 percent of the rated lumens to project above 80 degrees from vertical
2. 2.5 percent of the rated lumens to project above 90 degrees from vertical

86-6.02B(7) Thermal Management

The passive thermal management of the heat generated by the LEDs must have enough capacity to ensure proper operation of the luminaire over the minimum operation life. The LED maximum junction temperature for the minimum operation life must not exceed 221 degrees F.

The junction-to-ambient thermal resistance must be 95 degrees F per watt or less. The use of fans or other mechanical devices is not allowed. The heat sink material must be aluminum or other material of equal or lower thermal resistance.

The luminaire must contain circuitry that automatically reduces the power to the LEDs so the maximum junction temperature is not exceeded when the ambient outside temperature is 100 degrees F or greater.

86-6.02B(8) Physical and Mechanical Requirements

The luminaire must:

1. Be a single, self-contained device not requiring job-site assembly for installation
2. Have an integral power supply
3. Weigh no more than 35 lb
4. Have a maximum-effective projected area of 1.4 sq ft when viewed from either side or end
5. Have a housing color that matches color number 26152 of FED-STD-595.

The housing must be fabricated from materials designed to withstand a 3,000-hour salt spray test under ASTM B 117. All aluminum used in housings and brackets must be made of a marine-grade alloy with less than 0.2 percent copper. All exposed aluminum must be anodized.

Each refractor or lens must be made from UV-inhibited high-impact plastic such as acrylic or polycarbonate or heat- and impact-resistant glass and be resistant to scratching. Polymeric materials except lenses of enclosures containing either the power supply or electronic components of the luminaire must be made of UL94VO flame retardant materials. The housing's paint must comply with section 86-2.16. A chromate conversion undercoating must be used underneath a thermoplastic polyester powder coat.

Provide each housing with a slip fitter capable of mounting on a 2-inch pipe tenon. This slip fitter must fit on mast arms with outside diameters from 1-5/8 to 2-3/8 inches. The slip fitter must be capable of being adjusted a minimum of ±5 degrees from the axis of the tenon in a minimum of 5 steps: +5, +2.5, 0, -2.5, -5. The clamping brackets of the slip fitter must not bottom out on the housing bosses when adjusted within the designed angular range. No part of the slip fitter's mounting brackets must develop a permanent set in excess of 1/32 inch when the bracket's two or four 3/8-inch-diameter cap screws are tightened to 10 ft-lb. Two sets of cap screws may be furnished to allow the slip fitter to be mounted on the pipe tenon in the acceptable range without the cap screws bottoming out in the threaded holes. The cap screws and the clamping brackets must be made of corrosion-resistant materials or treated to prevent galvanic reactions and be compatible with the luminaire housing and the mast arm.

The LED luminaire must be assembled and manufactured such that its internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources. When tested under California Test 611, the luminaire to be mounted horizontally on the mast arm must be capable of withstanding the following cyclic loading for a minimum of 2 million cycles without failure of any luminaire part:

Cyclic Loading

Plane	Power supply	Minimum peak acceleration level
Vertical	Installed	3.0 g peak-to-peak sinusoidal loading (same as 1.5 g peak)
Horizontal[a]	Installed	1.5 g peak-to-peak sinusoidal loading (same as 0.75 g peak)

[a]Perpendicular to the direction of the mast arm

The housing must be designed to prevent the buildup of water on top of the housing. Exposed heat sink fins must be oriented to allow water to freely run off of the luminaire and carry dust and other accumulated debris away from the unit. The optical assembly of the luminaire must be protected against dust and moisture intrusion to at least an ANSI/IEC rating of IP66. The power supply enclosure must be protected to at least an ANSI/IEC rating of IP43.

Furnish each mounted luminaire with an ANSI C136.10-compliant, locking-type photocontrol receptacle and a raintight shorting cap. The receptacle must comply with section 86-6.11A.

When the components are mounted on a down-opening door, the door must be hinged and secured to the luminaire housing separately from the refractor or flat lens frame. The door must be secured to the housing such that accidental opening is prevented. A safety cable must mechanically connect the door to the housing.

Field wires connected to the luminaire must terminate on a barrier-type terminal block secured to the housing. The terminal screws must be captive and equipped with wire grips for conductors up to no. 6. Each terminal position must be clearly identified.

The power supply must be rated for outdoor operation and have at least an ANSI/IEC rating of IP65.

The power supply must be rated for a minimum operational life equal to the minimum operational life of the luminaire or greater.

The power supply case temperature must have a self rise of 77 degrees F or less above ambient temperature in free air with no additional heat sinks.

The power supply must have 2 leads to accept standard 0-10 V(dc). The dimming control must be compatible with IEC 60929. If the control leads are open or the analog control signal is lost, the circuit must default to 100-percent power.

Conductors and terminals must be identified.

86-6.02C Construction

Not Used

86-6.02D Payment

Not Used

BID ITEM LIST
08-0J9904

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
21	150722	REMOVE PAVEMENT MARKER	EA	280		
22	150852	REMOVE SLOPE PAVING (SQYD)	SQYD	41		
23	BLANK					
24	152423	ADJUST MONUMENT TO GRADE	EA	15		
25	152440	ADJUST MANHOLE TO GRADE	EA	30		
26	152441	ADJUST VALVE BOX FRAME AND COVER TO GRADE	EA	24		
27	152454	ADJUST PULL BOX	EA	25		
28	153103	COLD PLANE ASPHALT CONCRETE PAVEMENT	SQYD	4,300		
29	BLANK					
30	160102	CLEARING AND GRUBBING (LS)	LS	LUMP SUM	LUMP SUM	
31	190101	ROADWAY EXCAVATION	CY	2,270		
32	200114	ROCK BLANKET	SQYD	140		
33	260203	CLASS 2 AGGREGATE BASE (CY)	CY	2,170		
34	390100	PRIME COAT	TON	5		
35	390132	HOT MIX ASPHALT (TYPE A)	TON	910		
36	394090	PLACE HOT MIX ASPHALT (MISCELLANEOUS AREA)	SQYD	4.1		
37	397005	TACK COAT	TON	3		
38	401055	JOINTED PLAIN CONCRETE PAVEMENT (RSC)	CY	66		
39	510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	10		
40	560248	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-UNFRAMED)	SQFT	450		

REPLACED PER ADDENDUM NO. 4 DATED FEBRUARY 17, 2016

BID ITEM LIST
08-0J9904

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
41	700617	DRAINAGE INLET MARKER	EA	15		
42	730070	DETECTABLE WARNING SURFACE	SQFT	590		
43	731627	MINOR CONCRETE (CURB, SIDEWALK AND CURB RAMP)	CY	710		
44	733000	PRE/POST CONSTRUCTION SURVEYS	EA	26		
45	750001	MISCELLANEOUS IRON AND STEEL	LB	4,450		
46	800103	TEMPORARY FENCE (TYPE CL-6)	LF	70		
47	800320	CHAIN LINK FENCE (TYPE CL-4)	LF	60		
48	030410	WARNING RAIL	LF	70		
49	840515	THERMOPLASTIC PAVEMENT MARKING	SQFT	3,810		
50	840560	THERMOPLASTIC TRAFFIC STRIPE (SPRAYABLE)	LF	7,680		
51	850122	PAVEMENT MARKER (RETROREFLECTIVE-RECESSED)	EA	330		
52	860890	MODIFY TRAFFIC MONITORING STATION (COUNT)	LS	LUMP SUM	LUMP SUM	
53	861497	MODIFY SIGNAL AND LIGHTING (LOCATION 1)	LS	LUMP SUM	LUMP SUM	
54	861498	MODIFY SIGNAL AND LIGHTING (LOCATION 2)	LS	LUMP SUM	LUMP SUM	
55	861499	MODIFY SIGNAL AND LIGHTING (LOCATION 3)	LS	LUMP SUM	LUMP SUM	
56	861500	MODIFY SIGNAL AND LIGHTING (LOCATION 4)	LS	LUMP SUM	LUMP SUM	
57	861505	MODIFY SIGNAL AND LIGHTING (LOCATION 5)	LS	LUMP SUM	LUMP SUM	
58	030411	MODIFY SIGNAL AND LIGHTING (LOCATION 6)	LS	LUMP SUM	LUMP SUM	
59	030412	REPLACE PULL BOX	EA	38		
60	BLANK					

REPLACED PER ADDENDUM NO. 4 DATED FEBRUARY 17, 2016

BID ITEM LIST
08-0J9904

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
61	153247	REMOVE CONCRETE (MISCELLANEOUS) (CY)	CY	620		
62	390136	MINOR HOT MIX ASPHALT	TON	3.2		
63	860090	MAINTAINING EXISTING TRAFFIC MANAGEMENT SYSTEM ELEMENTS DURING CONSTRUCTION	LS	LUMP SUM	LUMP SUM	
64	999990	MOBILIZATION	LS	LUMP SUM	LUMP SUM	

TOTAL BID: **$** _____